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**Resare et al.**

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(54) **HUB BORE MOUNTED CENTRAL TIRE INFLATION VALVE SYSTEM**

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(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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(65) **Prior Publication Data**

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**Related U.S. Application Data**

(63) Continuation of application No. 12/317,778, filed on Dec. 29, 2008, now Pat. No. 8,069,890.

(60) Provisional application No. 61/125,557, filed on Apr. 25, 2008.

(51) **Int. Cl.**  
**B60C 23/10** (2006.01)

(52) **U.S. Cl.**  
USPC ..... **152/417; 152/416**

(58) **Field of Classification Search**

USPC ..... 152/415-417  
See application file for complete search history.

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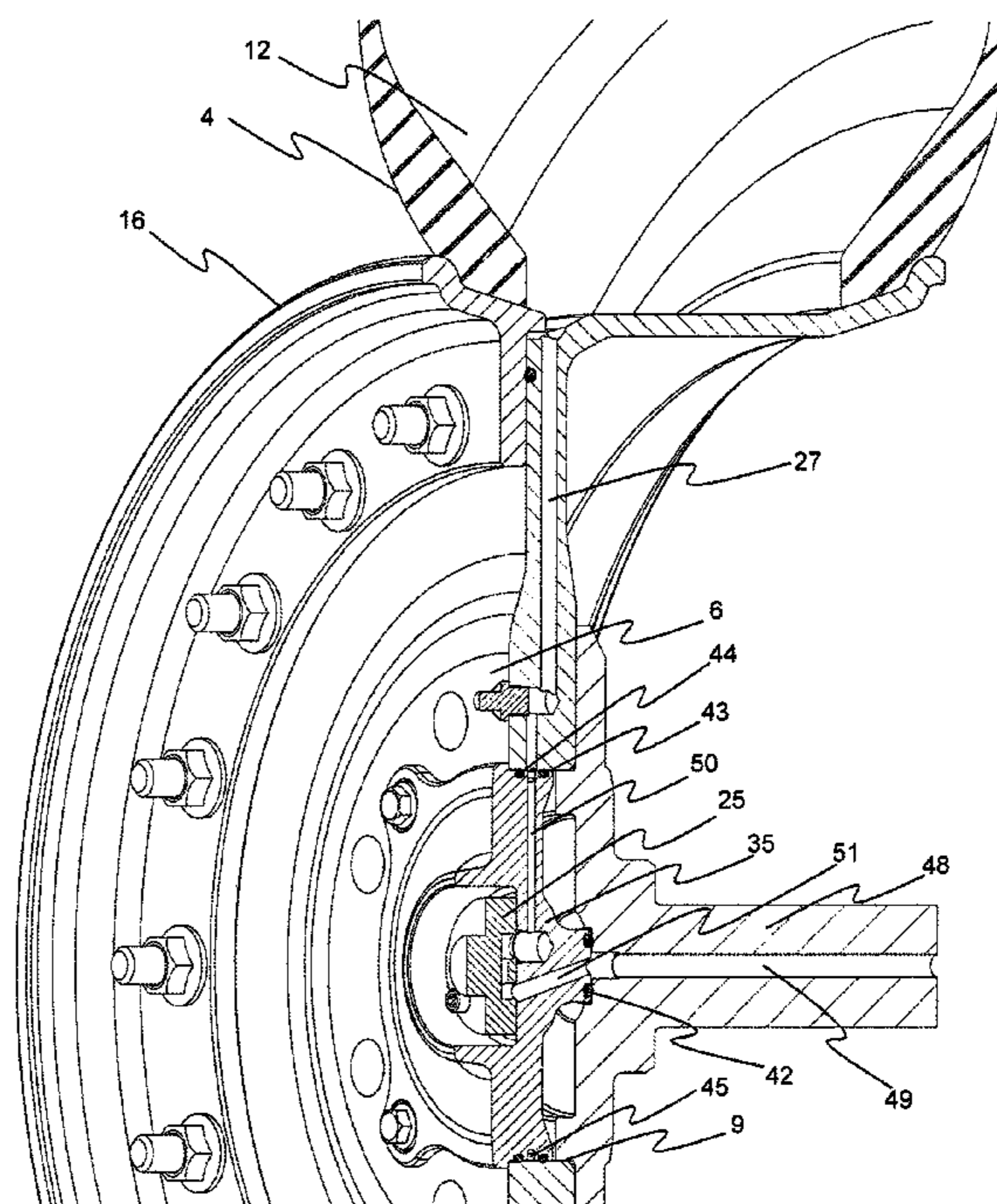
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(57) **ABSTRACT**

A central tire inflation system. The system includes a central tire inflation valve and a hub bore manifold. The hub bore manifold is connected to and surrounds the central tire inflation valve. The hub bore manifold defines first and second air passageways which are in communication with the central tire inflation valve. The hub bore manifold is configured for removable connection to a hub of a vehicle and is also configured to fit within a central opening of a wheel of the vehicle.

**20 Claims, 9 Drawing Sheets**



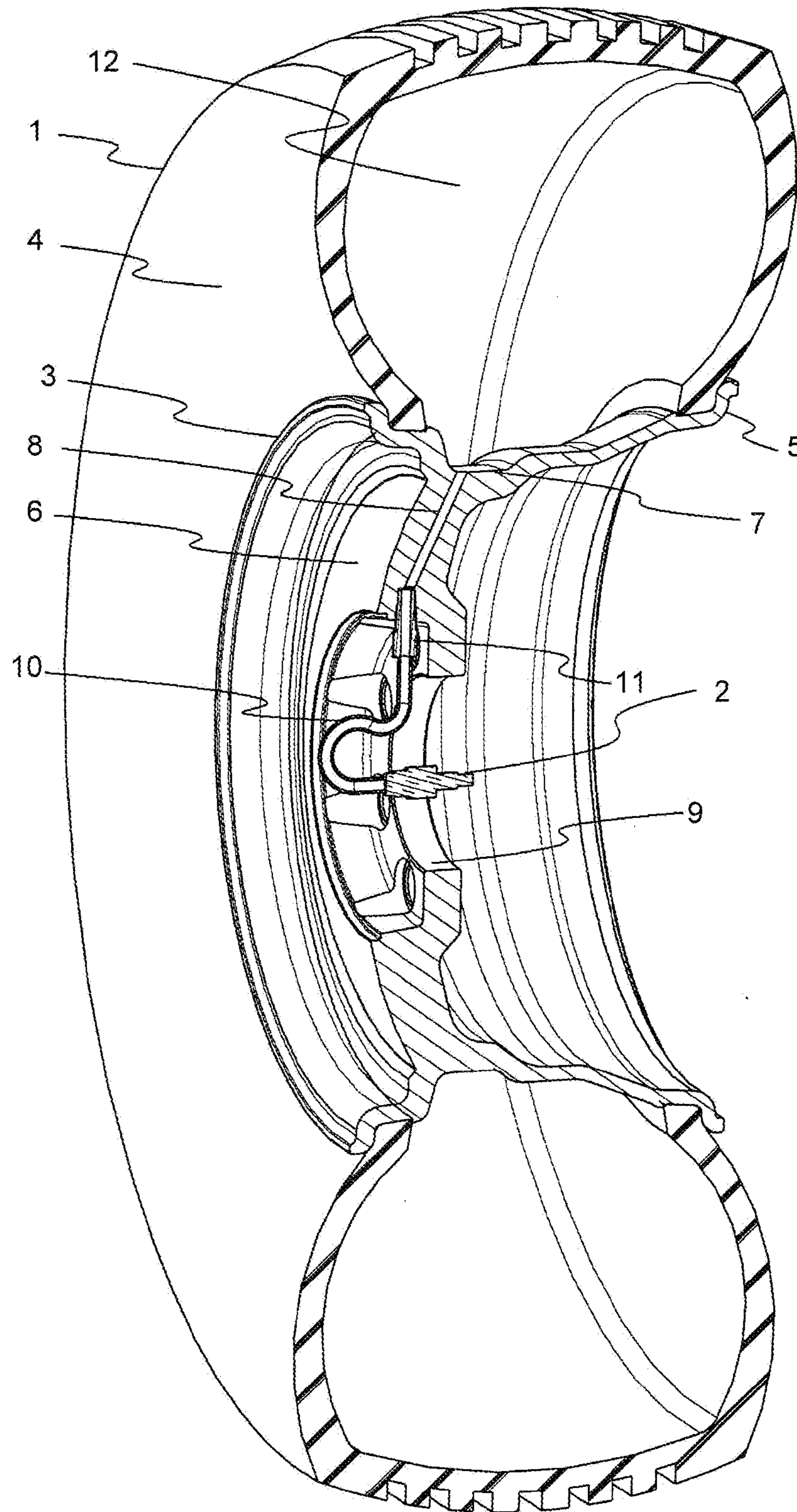


FIG. 1 (PRIOR ART)

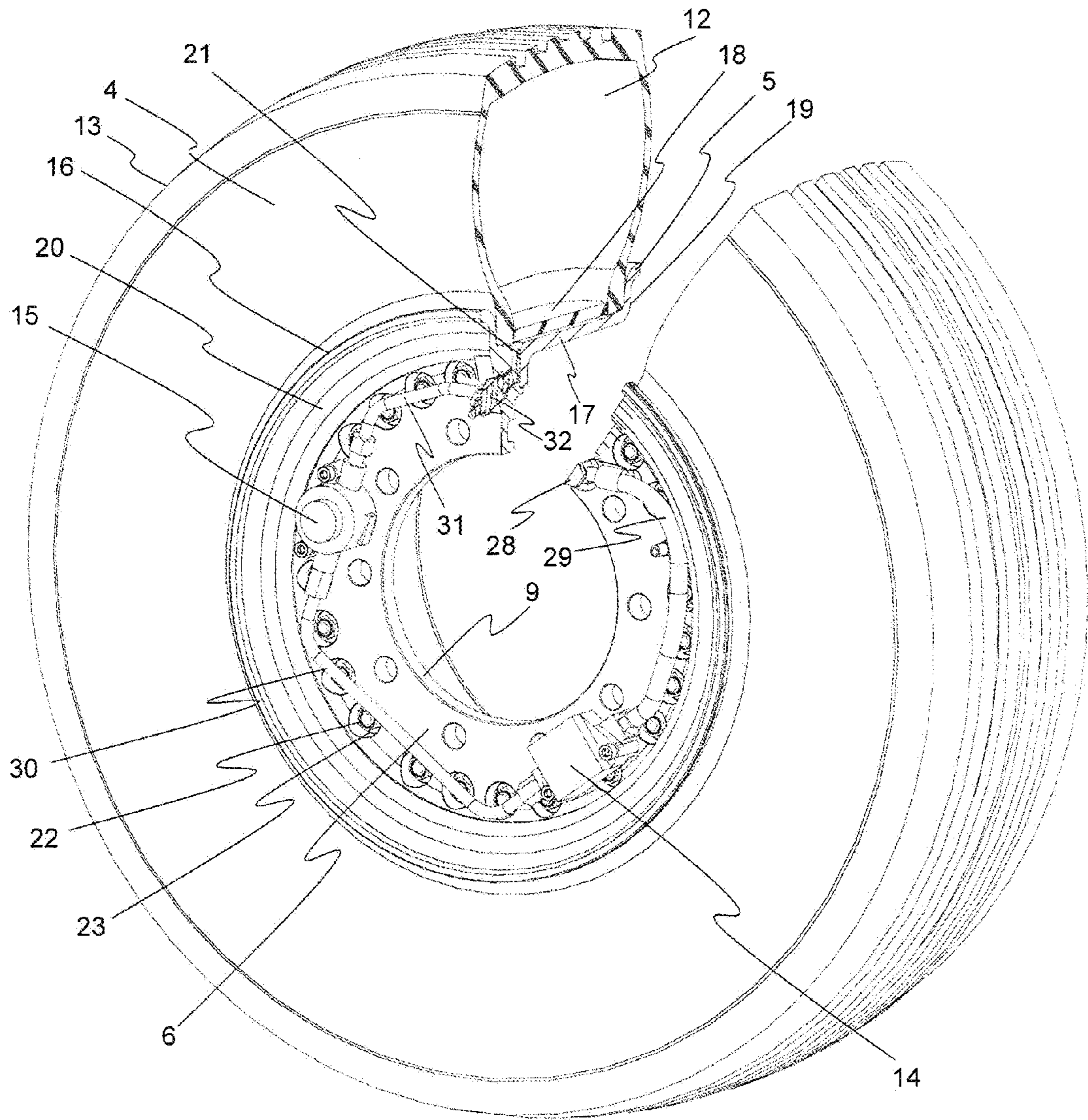


FIG. 2 (PRIOR ART)

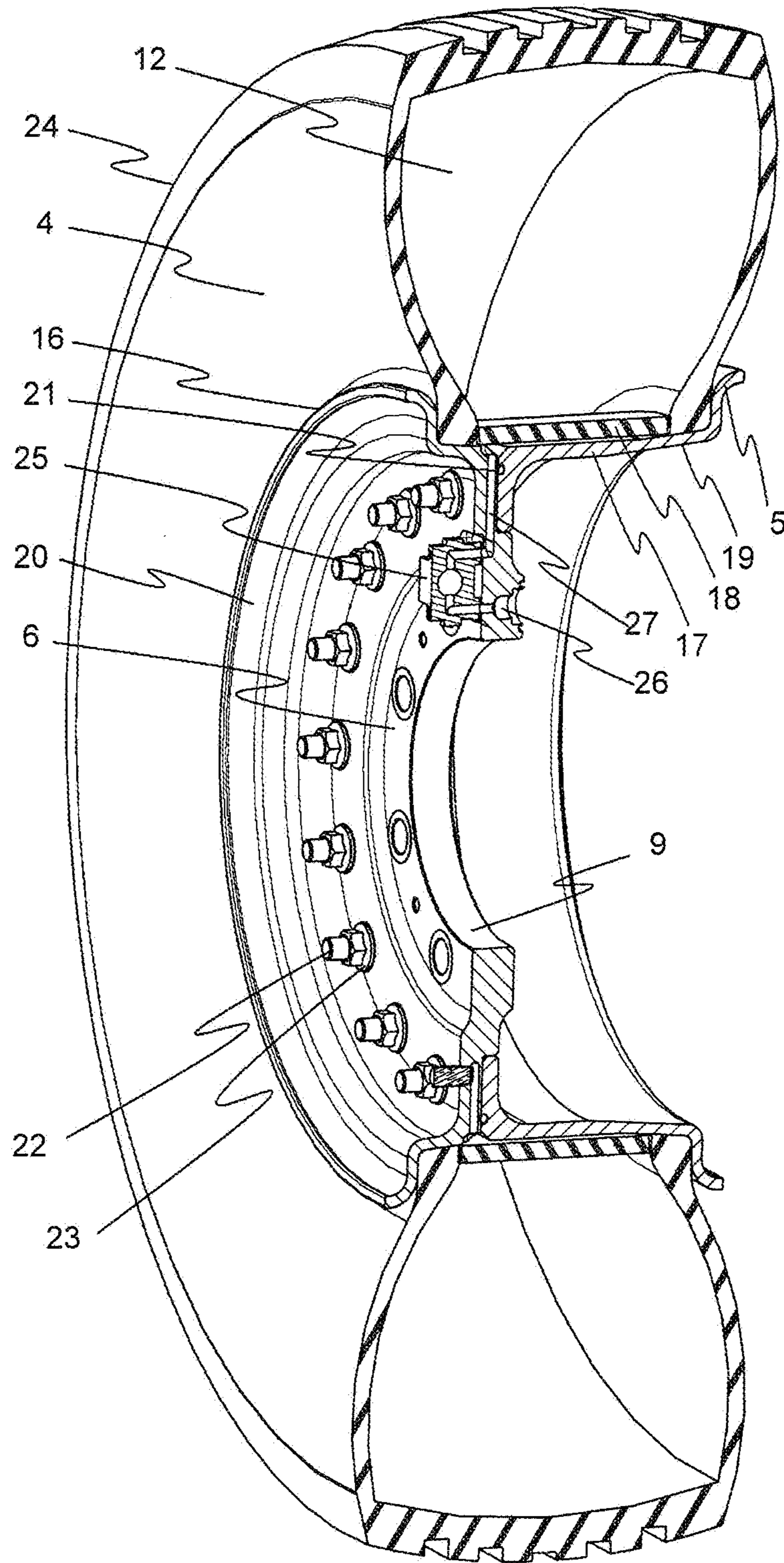


FIG. 3 (PRIOR ART)

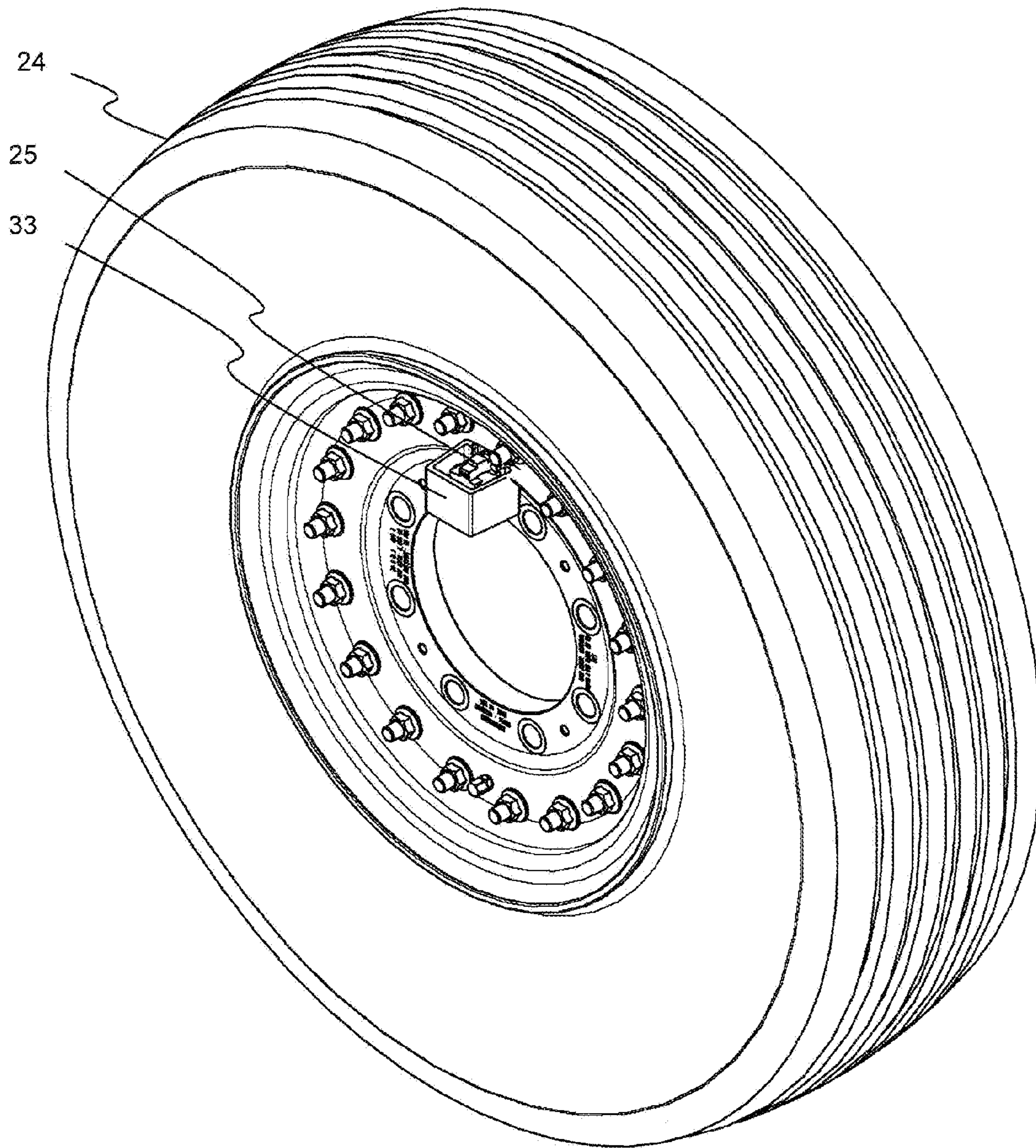


FIG. 4 (PRIOR ART)

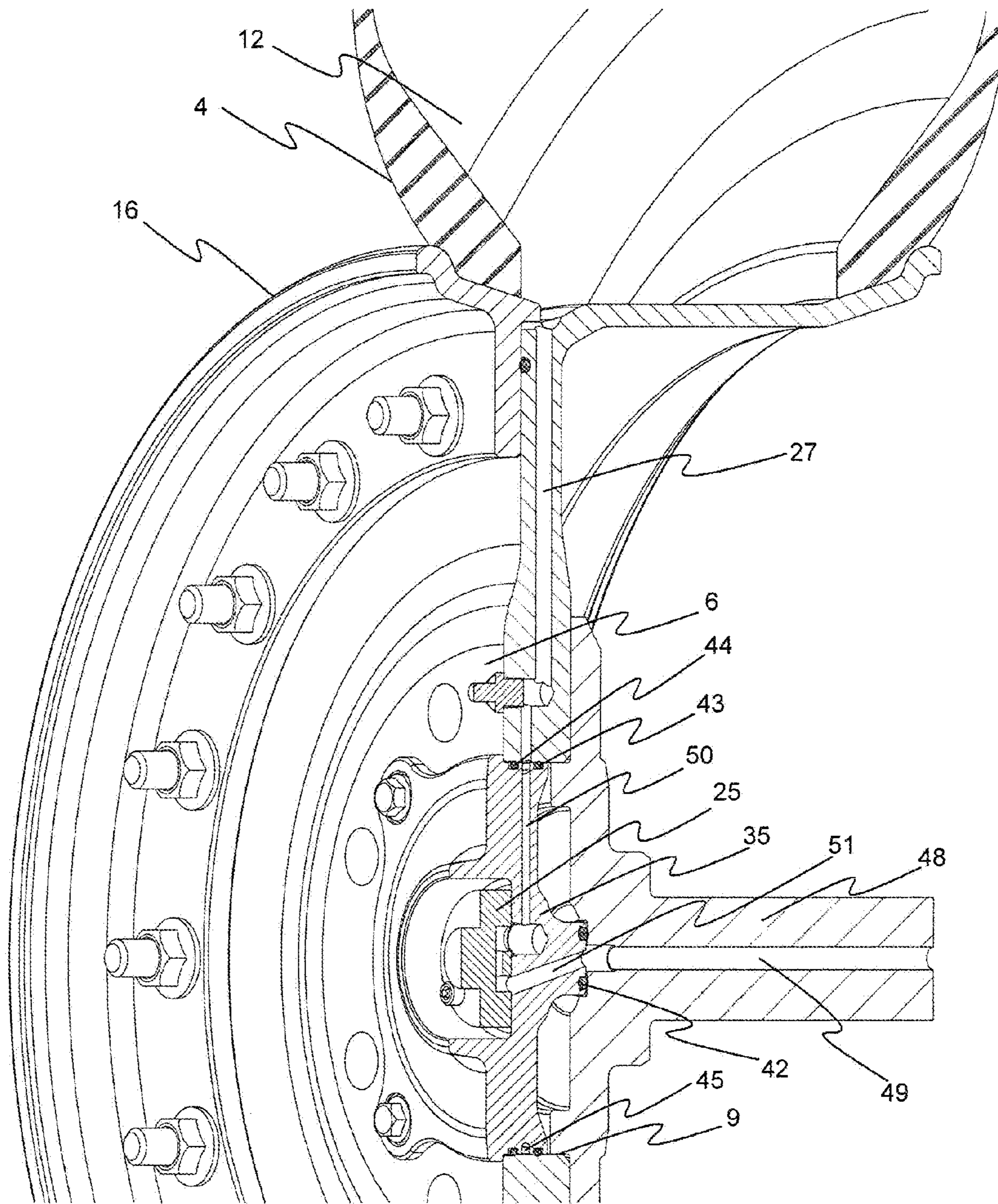


FIG. 5

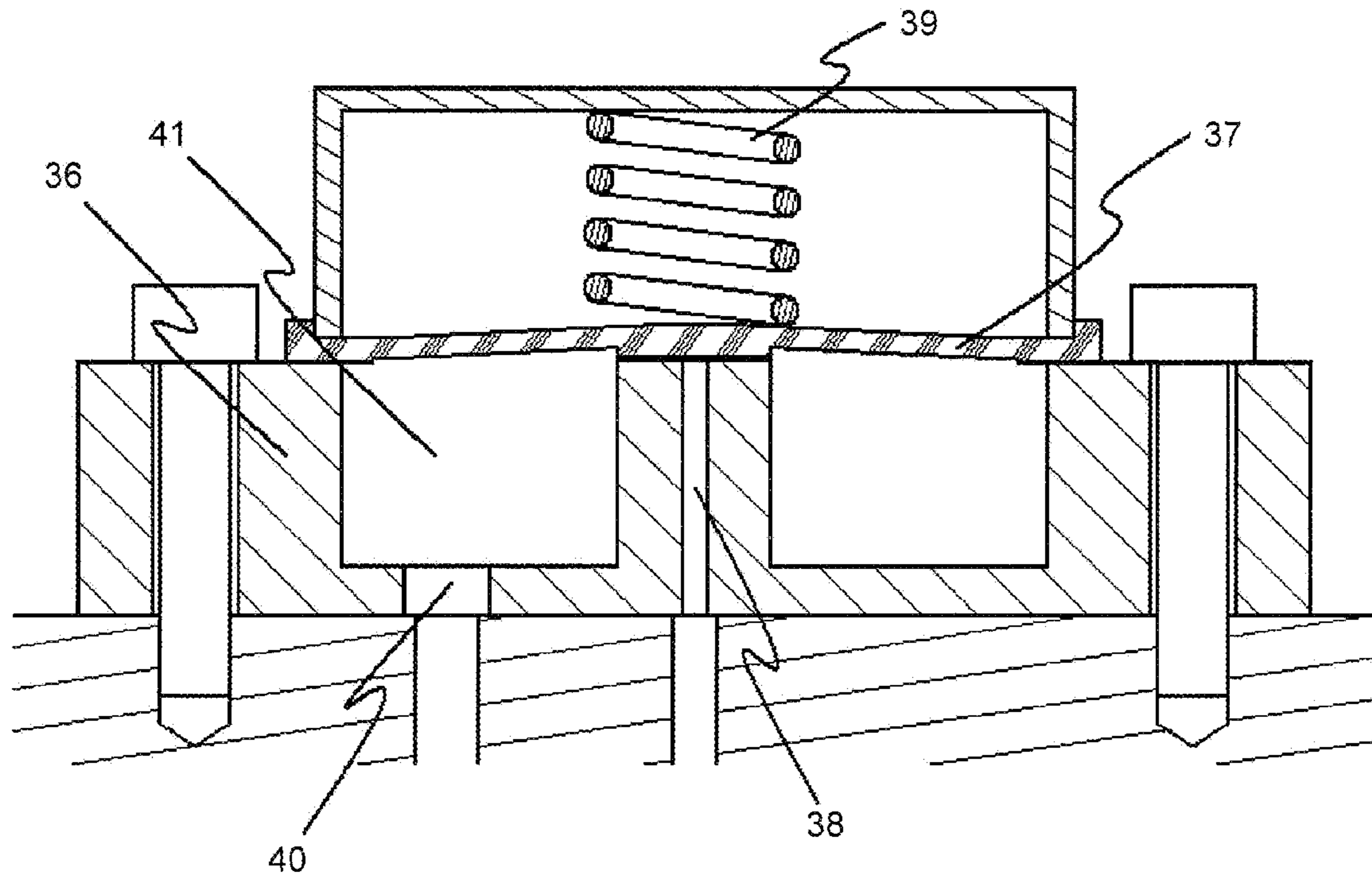


FIG. 6 (PRIOR ART)

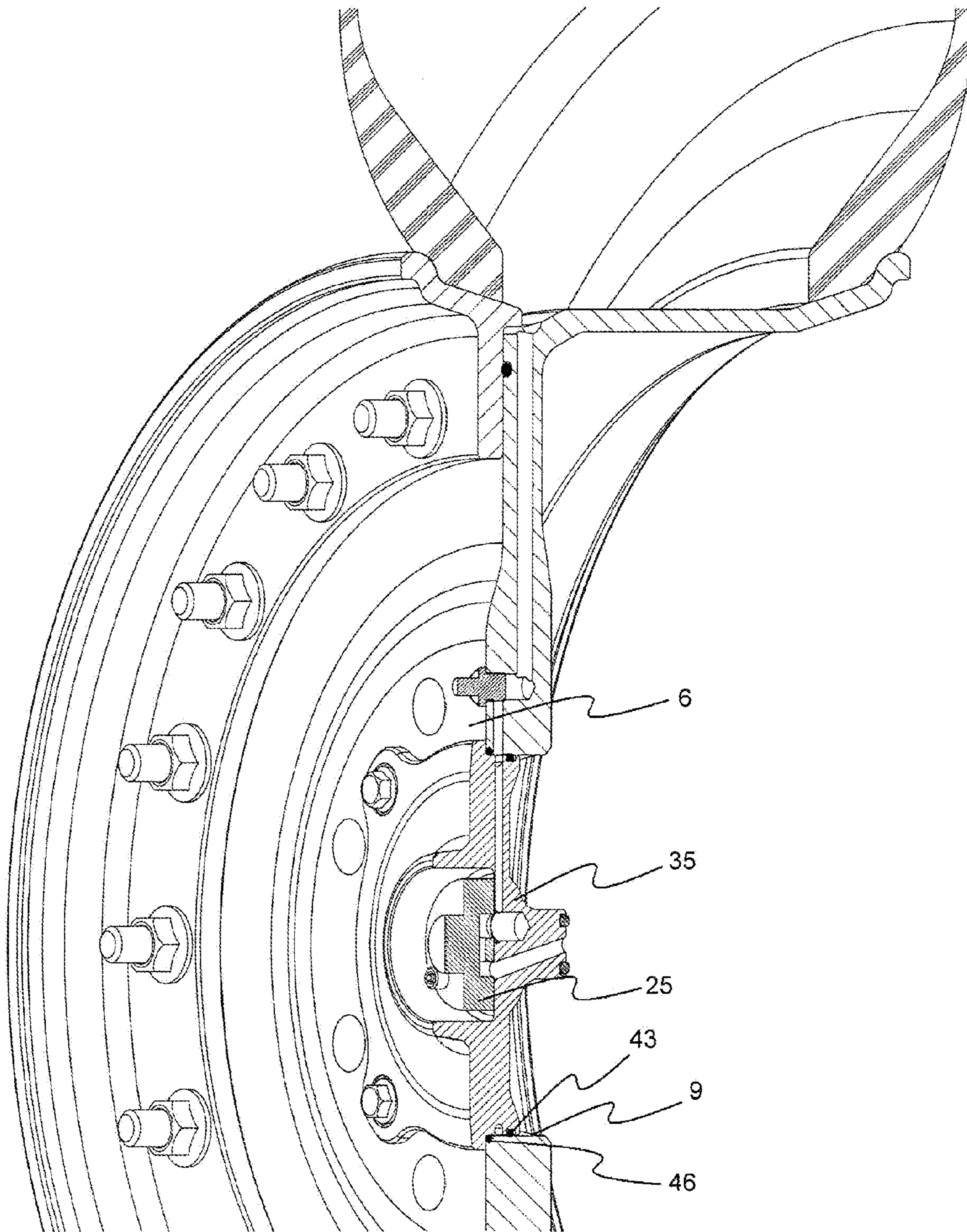


FIG. 7



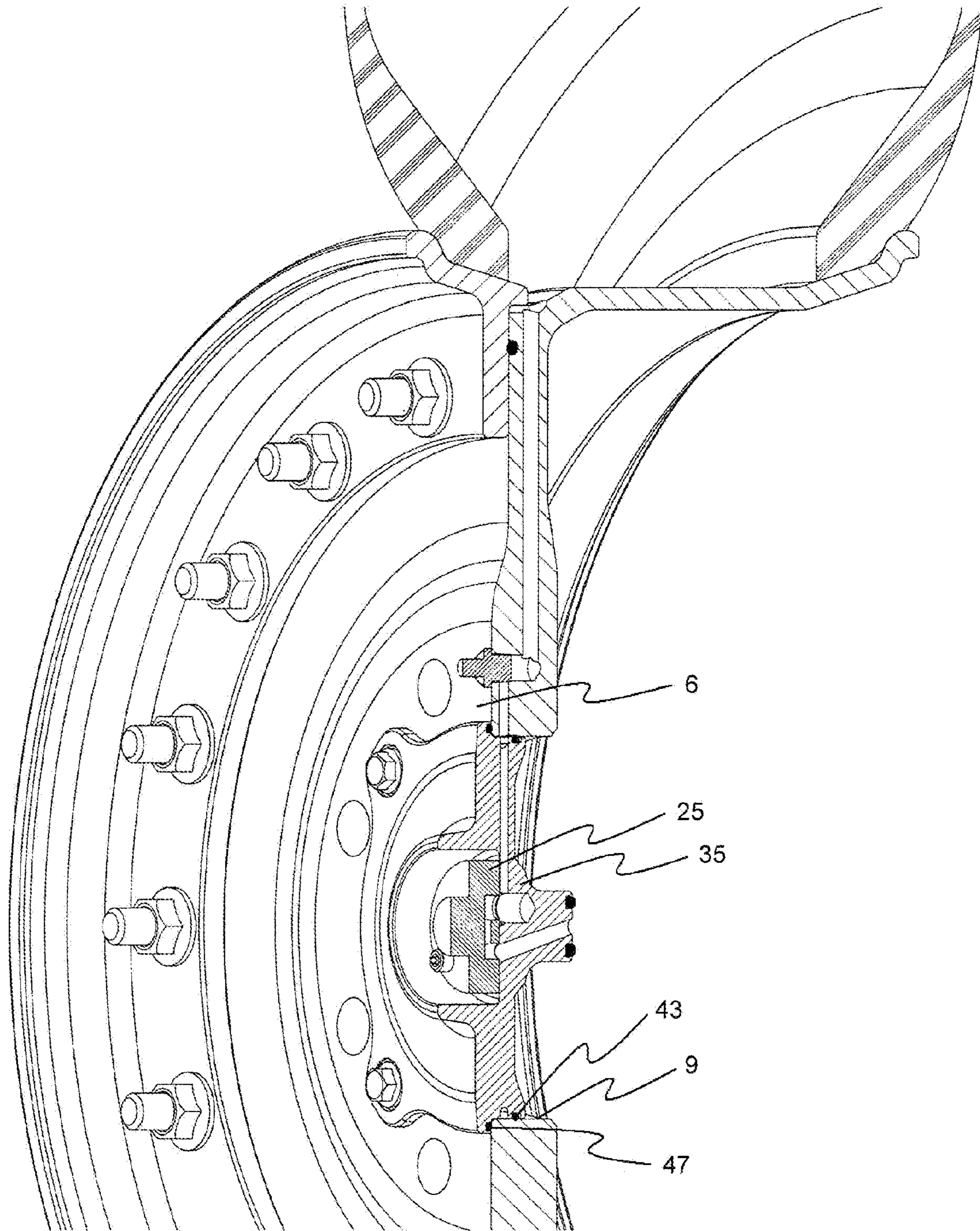


FIG. 8

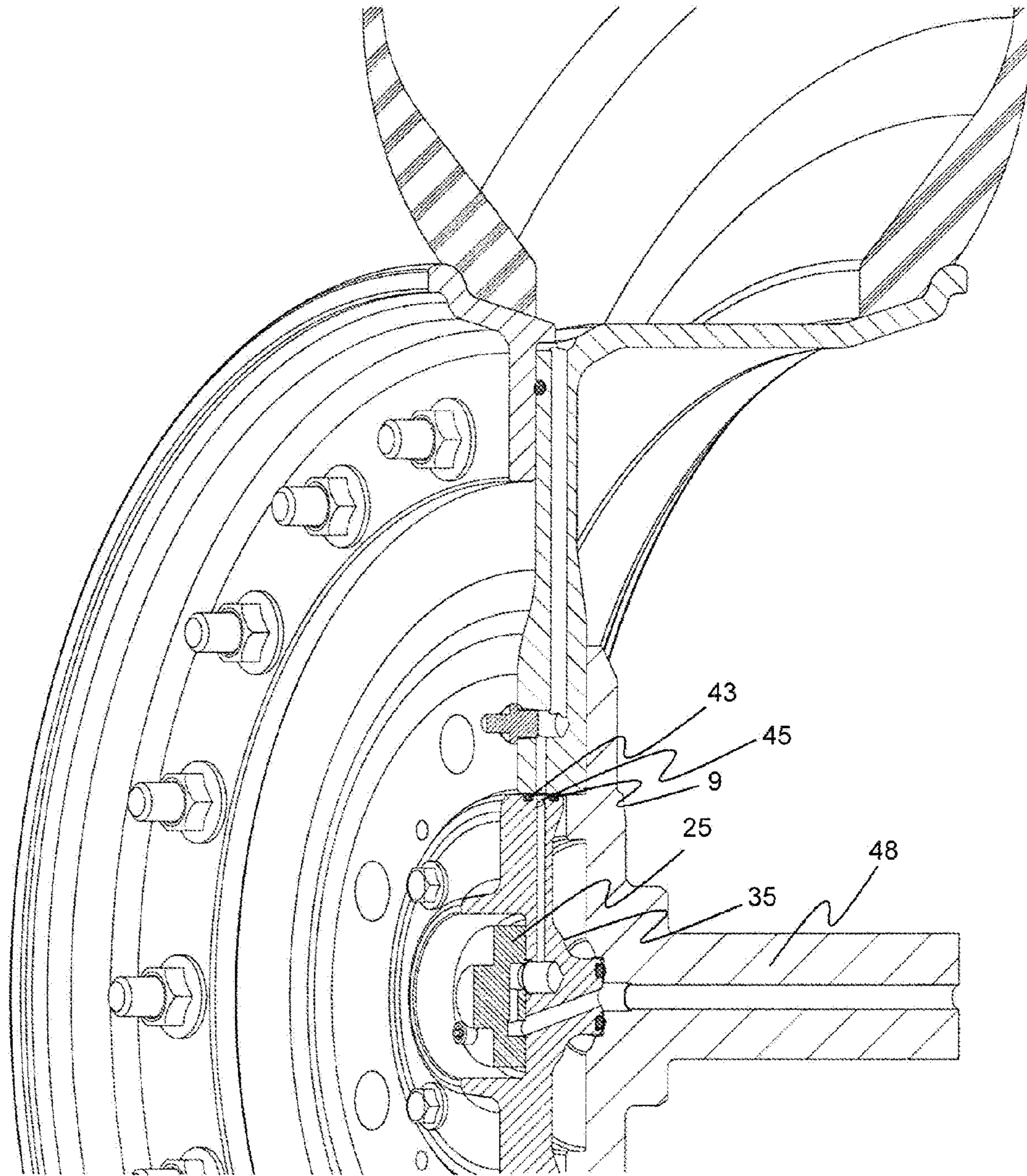


FIG. 9





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- 3 One-Piece Wheel
- 4 Tire
- 5 Rim Portion of Wheel
- 6 Disc Portion of Wheel
- 7 Drop Center Area of Wheel
- 8 Airway to Tire (from Fitting to the Tire Cavity)
- 9 Hub Bore Area of Wheel
- 10 Air Hose (Fitting to Fitting)
- 11 Hose Fitting (Hose to Wheel)
- 12 Tire Air Chamber
- 13 Two-Piece Wheel Assembly Configured for "External"  
CTI Valve
- 14 Quick Release Valve
- 15 External CTI Valve
- 16 Two-Piece Wheel
- 17 Rim Flat Area of Wheel
- 18 Beadlock
- 19 Inner Rim
- 20 Outer Rim
- 21 O-Ring (for Wheel Rims)
- 22 Assembly Bolt
- 23 Assembly Nut
- 24 Two-Piece Wheel Assembly Configured for an Inte-  
grated CTI Valve
- 25 Integrated CTI Valve
- 26 Airway in Wheel From Hub to CTI Valve
- 27 Airway in Wheel From CTI Valve to Tire Cavity
- 28 Hose Fitting (Hub to Hose, External CTI Setup)
- 29 CTI Air Hose (Hub to CTI Valve, External)
- 30 CTI Air Hose (CTI Valve to Quick Release Valve, Exter-  
nal)
- 31 CTI Air Hose (Quick Release Valve to Wheel Fitting,  
External)
- 32 Hose Fitting (Hose to Wheel, External)
- 33 CTI Valve Protection Cover
- 34 Two-Piece Wheel Assembly Configured for Hub  
Mounted Integrated CTI Valve
- 35 Hub Bore Manifold for CTI Valve
- 36 CTI Valve body/casing
- 37 CTI Valve Diaphragm
- 38 Tire-Side Port on CTI Valve
- 39 CTI Spring
- 40 Hub-Side Port on CTI Valve
- 41 CTI Valve Chamber
- 42 O-Ring-Face
- 43 O-Ring-Radial
- 44 O-Ring-Radial
- 45 Circumferential Groove/Channel
- 46 O-Ring-Chamber
- 47 O-Ring-Face
- 48 Vehicle Hub
- 49 Hub Port Air Passageway
- 50 Air Duct Connecting Internal Air Passageway
- 51 Hub Port Connecting Internal Air Passageway

What is claimed is:

1. A central tire inflation system, comprising:
  - a central tire inflation valve; and
  - a hub bore manifold connected to and surrounding the central tire inflation valve, wherein the hub bore manifold:
    - defines first and second air passageways in communication with the central tire inflation valve, wherein an end of the first air passageway is adjacent a first port of the central tire inflation valve and an end of the second air passageway is adjacent a second port of the central tire inflation valve;

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- is configured for removable connection to a hub of a vehicle; and
  - is configured to fit within a central opening of a wheel of the vehicle.
2. The system of claim 1, wherein the first air passageway is in communication with the second air passageway by way of the central tire inflation valve.
  3. The system of claim 1, wherein the first air passageway is in communication with an air passageway defined by the vehicle hub if the hub bore manifold is connected to the vehicle hub.
  4. The system of claim 1, wherein the second air passageway is in communication with an air passageway defined by the wheel if the wheel is mounted to the vehicle hub.
  5. The system of claim 1, wherein:
    - the first air passageway is in communication with an air passageway defined by the vehicle hub if the hub bore manifold is connected to the vehicle hub; and
    - the second air passageway is in communication with an air passageway defined by the wheel if the wheel is mounted to the vehicle hub.
  6. The system of claim 1, wherein the hub bore manifold has a substantially circular perimeter.
  7. The system of claim 1, wherein the hub bore manifold defines a groove along a periphery of the hub bore manifold.
  8. The system of claim 1, further comprising at least one sealing member positioned against the hub bore manifold.
  9. The system of claim 1, further comprising the wheel, wherein the central opening of the wheel surrounds the hub bore manifold.
  10. The system of claim 9, wherein the wheel defines a groove along a periphery of the central opening.
  11. The system of claim 9, wherein the air passageway defined by the wheel is in communication with an interior of a tire if the tire is mounted on the wheel.
  12. A central tire inflation system, comprising:
    - a central tire inflation valve;
    - a hub bore manifold connected to and surrounding the central tire inflation valve, wherein the hub bore manifold defines first and second air passageways in communication with the central tire inflation valve, wherein an end of the first air passageway is adjacent a first port of the central tire inflation valve and an end of the second air passageway is adjacent a second port of the central tire inflation valve; and
    - a wheel connected to the hub bore manifold, wherein the wheel defines a third air passageway, wherein the third air passageway is in communication with the second air passageway.
  13. The central tire inflation system of claim 12, wherein the first air passageway is in communication with the second air passageway by way of the central tire inflation valve.
  14. The system of claim 12, wherein the first air passageway is in communication with an air passageway defined by a vehicle hub if the wheel is connected to the vehicle hub.
  15. The system of claim 12, wherein the hub bore manifold defines a groove along a periphery of the hub bore manifold.
  16. The system of claim 12, wherein the hub bore manifold is surrounded by a central opening defined by the wheel.
  17. The system of claim 12, wherein the wheel is removably connected to the hub bore manifold.
  18. The system of claim 12, wherein the wheel defines a groove along a periphery of a central opening defined by the wheel.
  19. The system of claim 12, wherein the third air passageway is in communication with an interior of a tire if the tire is mounted on the wheel.

20. The system of claim 12, further comprising at least one sealing member positioned against the hub bore manifold.

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